

Applicants: Paul V. Werme *et al.*  
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**Amendments to the Claims:**

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1-37. (Cancelled)

38. (Currently Amended) A method for distributing application, system and network specification information to a resource allocation function that controls an N-plurality of hosts in a distributed environment, each host instantiating up to M managed characteristic applications, the resource allocation function communicating with an application control function, the method comprising:

providing instrumentation information to the resource allocation function, the instrumentation information being associated with the N-plurality of hosts;

preparing system specification files to describe system and network specification information;

linking the system specification files to the characteristic applications;

producing quality-of-service (QoS) information by the resource allocation function based on the instrumentation information, the QoS information being associated with the characteristic applications on the N-plurality of hosts;

allocating assigned hosts for processing the characteristic applications as control orders by the resource allocation function based on the QoS information, the assigned hosts being among the N-plurality of hosts; and

compiling commands for the respective characteristic applications by the application control function to the assigned hosts based on the control orders and the QoS information; and  
providing an application programming interface (API) that enables the QoS managers to access the specification information using API calls, wherein producing the QoS information further comprises:

analyzing the instrumentation information from the N-plurality of hosts by a corresponding N-plurality of QoS managers; and

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producing the QoS information by the QoS managers wherein providing the API further comprises:

providing a parser file that defines grammar, the parser file being compiled using a yacc utility;

providing a lexical analyzer file that defines language tokens, the lexical analyzer file being compiled using a lex utility; and

providing a set of C++ System Specification classes for storing specification file information.

39. (Previously Presented) The method as recited in claim 38, wherein preparing the system specification files is performed in a language that provides syntax adapted to describe the system and network specification information.

40. (Cancelled)

41. (Previously Presented) The method as recited in claim 38, wherein providing the instrumentation information further comprises:

reporting application events of the applications from the N-plurality of hosts;

collecting the application events as compiled events by an instrumentation collector;

correlating the compiled events as application metrics for the instrumentation information; and

providing the instrumentation information to the QoS managers.

42-43. (Cancelled)

44. (Currently Amended) The method as recited in claim-40 ~~38~~, wherein producing the QoS information further comprises:

copying a characteristic application of the M plurality of managed characteristic applications by the QoS managers as a copy for an additional host among the N-plurality of hosts.

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45. (Previously Presented) The method as recited in claim 44, wherein copying the characteristic application comprises:  
transmitting a scale request associated with the copy to the resource allocation function.

46. (Previously Presented) The method as recited in claim 38, wherein allocating the assigned hosts further comprises:  
analyzing the instrumentation information and the system specification files by a resource manager to assign priorities to the characteristic applications; and  
distributing the characteristic applications to the assigned hosts based on the priorities.

47. (Previously Presented) The method as recited in claim 46, further comprising:  
determining respective loads of the N-plurality of hosts by a hardware broker, the loads corresponding to computation requirements by the hosts and the network; and  
providing the loads to the resource manager.

48. (Previously Presented) The method as recited in claim 47, wherein determining the respective loads further comprises:  
receiving respective operational statuses of the N-plurality of hosts to the hardware broker from history servers associated with the hosts;  
assigning fitness scores associated with the respective operational statuses by the hardware broker; and  
determining the loads based on the fitness scores by the hardware broker.

49. (Previously Presented) The method as recited in claim 38, wherein compiling the commands further comprises:  
creating an instruction by a program control based on the control orders and the QoS information, the instruction being associated with a characteristic application of the M plurality of managed characteristic applications;  
compiling the instruction by the program control; and

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submitting the compiled instruction to the assigned hosts.

50. (Previously Presented) The method as recited in claim 49, wherein creating the instruction further includes creating a process startup order in response to a notification of QoS violation from the resource allocation function.

51. (Previously Presented) The method as recited in claim 49, wherein creating the instruction further includes creating a process shutdown order in response to a notification of QoS violation from the resource allocation function.

52. (Previously Presented) A method for distributing application, system and network specification information to a resource allocation function that controls an N-plurality of hosts in a distributed environment, each host instantiating up to M managed characteristic applications, the resource allocation function communicating with an application control function, the method comprising:

- providing instrumentation information to an N-plurality of quality-of-service (QoS) managers of the resource allocation function, the instrumentation information being associated with the N-plurality of hosts, the QoS managers being associated with the N-plurality of hosts;

- preparing system specification files to describe system and network specification information;

- linking the system specification files to the characteristic applications;

- producing QoS information by the QoS managers based on the instrumentation information, the QoS information being associated with the characteristic applications on the N-plurality of hosts;

- analyzing the instrumentation information and the system specification files by a resource manager of the resource allocation function;

- allocating assigned hosts for processing the characteristic applications as control orders by the resource manager based on the QoS information, the assigned hosts being among the N-plurality of hosts; and

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compiling commands for the respective characteristic applications by a program controller of the application control function to the assigned hosts based on the control orders and the QoS information.

53. (Previously Presented) The method as recited in claim 52, wherein allocating the assigned hosts further comprises:

- analyzing the instrumentation information and the system specification files by the resource manager to assign priorities to the characteristic applications; and
- distributing the characteristic applications to the assigned hosts based on the priorities.

54. (Previously Presented) The method as recited in claim 52, wherein compiling the commands further comprises:

- creating an instruction by a program control based on the control orders and the QoS information, the instruction being associated with a characteristic application of the M plurality of managed characteristic applications;
- compiling the instruction by the program control; and
- submitting the compiled instruction to the assigned hosts.

55. (Previously Presented) The method as recited in claim 52, further comprising:

- determining respective loads of the N-plurality of hosts by a hardware broker, the loads corresponding to computation requirements by the hosts and the network; and
- providing the loads to the resource manager.

56. (Previously Presented) The method as recited in claim 55, wherein determining the respective loads further comprises:

- receiving respective operational statuses of the N-plurality of hosts to the hardware broker from history servers associated with the hosts;
- assigning fitness scores associated with the respective operational statuses by the hardware broker; and
- determining the loads based on the fitness scores by the hardware broker.

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57. (Previously Presented) The method as recited in claim 52, wherein producing the QoS information further comprises:

copying a characteristic application of the M plurality of managed characteristic applications by the QoS managers as a copy for an additional host among the N-plurality of hosts.

58. (Previously Presented) The method as recited in claim 57, wherein copying the characteristic application further comprises:

transmitting a scale request associated with the copy to the resource manager.

59. (Previously Presented) A process control system controlling an N-plurality of hosts in a distributed environment, each host instantiating up to M managed characteristic applications, the system comprising:

a plurality of quality-of-service (QoS) managers corresponding to the N-plurality of hosts, the QoS managers receiving instrumentation information from the respective hosts and producing QoS information based on the instrumentation information, the instrumentation information being associated with the N-plurality of hosts, the QoS information being associated with the characteristic applications on the N-plurality of hosts;

a library that links system specification files that describe system and network specification information, the library linking the specification files to the characteristic applications;

a resource manager that allocates assigned hosts for processing the characteristic applications as control orders based on the QoS information, the assigned hosts being among the N-plurality of hosts; and

a program controller that compiles commands for the respective characteristic applications to the assigned hosts based on the control orders and the QoS information; and

an application programming interface (API) that enables the QoS managers to access the specification information using API calls, wherein the API further comprises:

a parser file that defines grammar, the parser file being compiled using a yacc utility;

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a lexical analyzer file that defines language tokens, the lexical analyzer file being compiled using a lex utility; and  
a set of C++ System Specification classes for storing specification file information.

60. (Previously Presented) The system as recited in claim 59, further comprising:  
an instrumentation collector that receives application events as compiled events, the application events being reported from the N-plurality of hosts; and  
an instrumentation correlator that correlates the compiled events as application metrics for the instrumentation information.
61. (Previously Presented) The system as recited in claim 59, further comprising:  
a hardware broker that analyzes history server information and provides respective loads of the N-plurality of hosts to the resource manager, the loads corresponding to computation requirements by the hosts and the network.
62. (Previously Presented) The system as recited in claim 61, further comprising  
history servers associated with the N-plurality of hosts, the history servers providing operational statuses of the hosts to the hardware broker determining the respective loads.
63. (Previously Presented) The system as recited in claim 62, wherein the loads are determined from fitness scores, and the fitness scores are determined from the operational statuses.
64. (Currently Amended) The system as recited in claim-~~59~~ 52, further comprising:  
an application programming interface (API) that enables the QoS managers to access the specification information using API calls.
65. (Currently Amended) The system as recited in claim-~~66~~ 64, wherein the API further comprises:  
a parser file that defines grammar, the parser file being compiled using a yacc utility;

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a lexical analyzer file that defines language tokens, the lexical analyzer file being compiled using a lex utility; and

a set of C++ System Specification classes for storing specification file information.

66. (Previously Presented) The system as recited in claim 59, wherein the program controller communicates with the hosts using operating systems.

67. (Previously Presented) The system as recited in claim 59, wherein at least one of the up to M managed characteristic applications comprises a scalable application.

68. (Previously Presented) The system as recited in claim 59, wherein at least one of the up to M managed characteristic applications comprises a fault tolerant application, where the degree of fault tolerance is user selectable.

69. (Previously Presented) The system as recited in claim 59, wherein the instrumentation information provides condition metrics of the characteristic applications, the conditions including at least one of execution status, computation cycles, running duration and memory usage.

70. (Previously Presented) The system as recited in claim 59, further comprising:  
an N-plurality of program control displays corresponding to the hosts and communicating with the program controller, the displays displaying information from the resource manager.

71. (Previously Presented) The system as recited in claim 59, wherein the QoS managers copy a characteristic application of the M plurality of managed characteristic applications as a copy for an additional host among the N-plurality of hosts.

72. (Previously Presented) The system as recited in claim 71, wherein the QoS managers transmit a scale request associated with the copy to the resource manager.